

The invention claimed is:

1. An electrochemical battery cell comprising:  
a housing comprising a metal container with at least one open end and at least a first metal cover disposed in the at least one open end of the container;  
5 a positive electrode;  
a negative electrode;  
a separator disposed between the positive and negative electrodes;  
an electrolyte; and  
a first thermoplastic seal member, comprising a thermoplastic resin and more than  
10 10 weight percent of a thermal-stabilizing filler, the first thermoplastic seal member sealing an aperture in at least one of the container and the first cover and forming at least a part of a pressure relief vent for releasing pressure from the cell.
2. The cell as defined in claim 1, wherein the first thermoplastic seal member  
15 comprises at least 15 weight percent of the thermal-stabilizing filler.
3. The cell as defined in claim 1, wherein the filler comprises a glass.
4. The cell as defined in claim 3, wherein the glass comprises glass fibers.
- 20 5. The cell as defined in claim 3, wherein the glass comprises an E-glass.
6. The cell as defined in claim 1, wherein cell further comprises a second thermoplastic seal member providing a seal between the container and the first cover.
- 25 7. The cell as defined in claim 1, wherein the first thermoplastic seal member comprises a hollow cylindrical shape and is disposed within the aperture in the first metal cover.
- 30 8. The cell as defined in claim 7, wherein the pressure relief vent further comprises a plug disposed within the first thermoplastic seal member and the first metal cover, the first thermoplastic seal member and the plug cooperate to form a compression seal for the aperture.
- 35 9. The cell as defined in claim 8, wherein the plug is in the form of sphere.

10. The cell as defined in claim 9, wherein the plug comprises one member of the group consisting of a metal and a glass.

5 11. The cell as defined in claim 7, wherein the first thermoplastic seal member is a plug and the pressure relief mechanism consists of the plug disposed within the aperture in the first metal cover.

12. The cell as defined in claim 1, wherein the electrolyte is a nonaqueous electrolyte.

10 13. The cell as defined in claim 12, wherein the electrolyte comprises an organic solvent.

14. The cell as defined in claim 13, wherein the negative electrode comprises at least one member of the group consisting of lithium, a lithium alloy and a lithium intercalation compound.

15 15. The cell as defined in claim 14, wherein the positive electrode comprises at least one member of the group consisting of iron disulfide, manganese dioxide and a lithium intercalation compound.

16. The cell as defined in claim 13, wherein the organic solvent comprises at least one ether compound.

25 17. The cell as defined in claim 16, wherein the organic solvent comprises at least 80 volume percent of one or more ethers having a boiling point no greater than 90°C.

18. An electrochemical battery cell comprising:

30 a housing comprising a metal container with at least one open end and at least a first metal cover disposed in the at least one open end of the container;

a pressure relief vent;

a positive electrode;

a negative electrode comprising at least one member of the group consisting of lithium, a lithium alloy and a lithium intercalation compound;

35 a separator disposed between the positive and negative electrodes;

a nonaqueous electrolyte comprising an organic solvent; and

a first thermoplastic seal member sealing an aperture in the first cover;  
wherein the thermoplastic seal member:

is made from a material comprising at least one polymeric resin selected from the group consisting of ethylene-tetrafluoroethylene, polybutylene terephthalate, polyphenylene sulfide, polyphthalamide, ethylene-chlorotrifluoroethylene, chlorotrifluoroethylene, perfluoroalkoxyalkane, fluorinated perfluoroethylene polypropylene and polyetherether ketone, as well as more than 10 weight percent of a thermal-stabilizing filler;

has a hollow cylindrical shape; and

cooperates with the first metal cover and a plug disposed within the thermoplastic seal member to form a compression seal for the aperture and to release pressurized gas from within the cell when a cell internal pressure exceeds a predetermined level.

19. The cell as defined in claim 18, wherein the at least one polymeric resin is selected from the group consisting of ethylene-tetrafluoroethylene, polybutylene terephthalate, polyphenylene sulfide and polyphthalamide.

20. The cell as defined in claim 18, wherein the first thermoplastic seal member comprises at least 15 weight percent of the thermal-stabilizing filler.

21. The cell as defined in claim 18, wherein the filler comprises glass fibers comprising an E-glass.

22. The cell as defined in claim 18, wherein the hollow cylindrical shape has a wall with an average original thickness, before the first thermoplastic seal member is placed into the first metal cover aperture, of 0.006 to 0.015 inch and is compressed by an average of 25 to 40 percent of the original thickness between the first metal cover and the plug.

23. The cell as defined in claim 19, wherein the organic solvent comprises at least 90 volume percent ethers with boiling points no greater than 90°C.

24. The cell as defined in claim 19, wherein the at least one resin is selected from the group consisting of ethylene-tetrafluoroethylene and polybutylene terephthalate.

25. The cell as defined in claim 24, wherein the resin is ethylene-tetrafluoroethylene.